

# COMPASS-U

**Basic design issues**

# Basic parameters of COMPASS-U

## Basic dimensions and parameters:

R = 0,84 m

a = 0,28 m

$B_T$  = 5 T

$I_p$  = 2 MA

$P_{NBI}$  = 4-5 MW

$P_{ECRH}$  = 4 MW (170 GHz) – later phase

Flat-top pulse length 1 – 5 sec

Aspect ratio = 3.2

Elongation = 1.7 – 1.9

Triangularity = 0.4 – 0.6

Plasma volume  $\sim 2 \text{ m}^3$

Metallic first wall device

High-temperature operation  $\sim 300^\circ\text{C}$  (maybe  $500^\circ\text{C}$ )

Single and double null geometry (possibly single and double snow-flake geometry upto 1 MA)

- Closed and well diagnosed high density divertors
- High power fluxes in the divertor ( $\lambda_q \sim 1 \text{ mm} \Rightarrow \approx 15 \text{ MW/m}^2$ )
- Possibility to study physics of advanced modes (QH-mode, I-mode, EDA-mode, etc.)

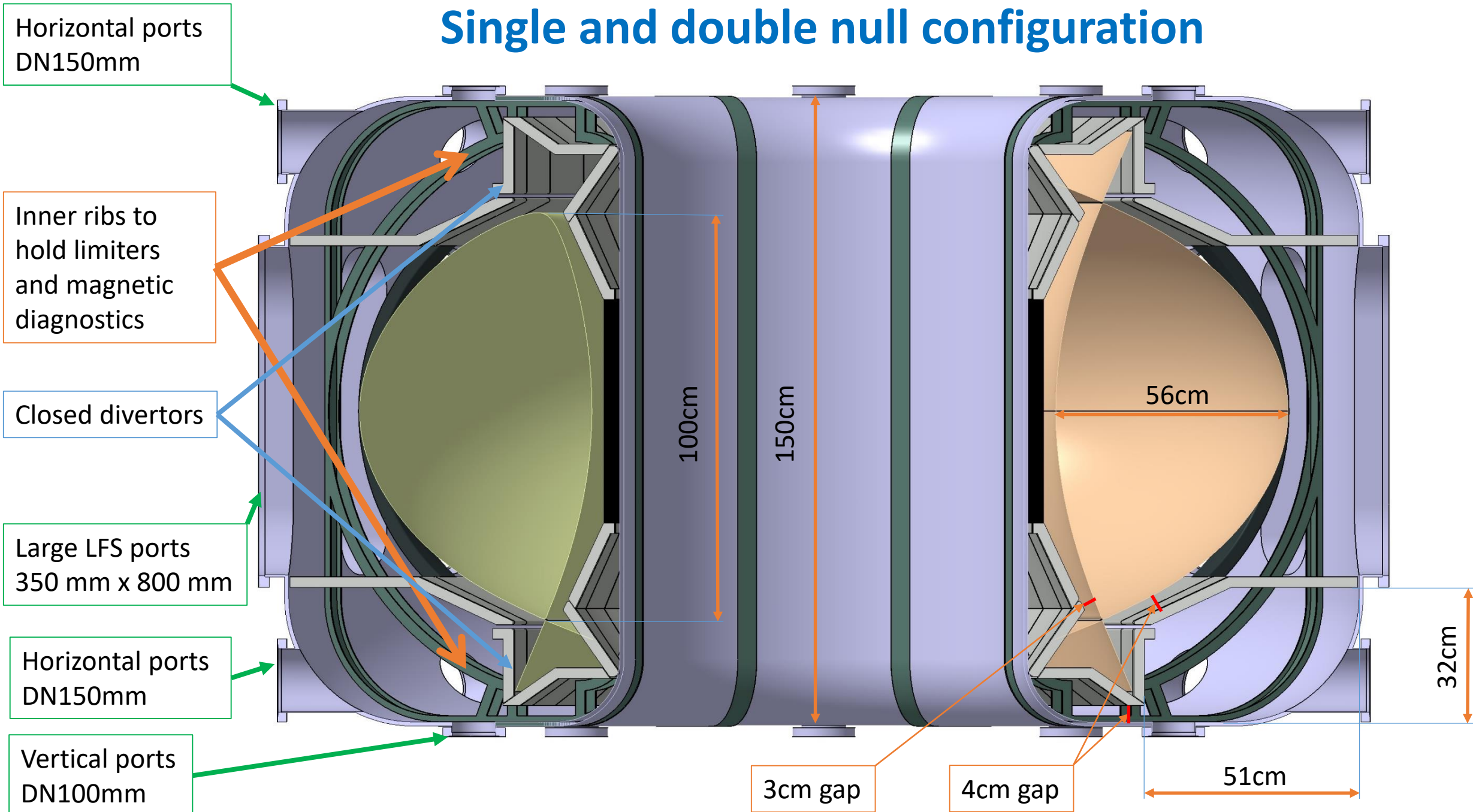
High capability to address the key Plasma Exhaust Physics challenges

Design has to enable installation of Liquid Metal divertor technology (capillary porous system)

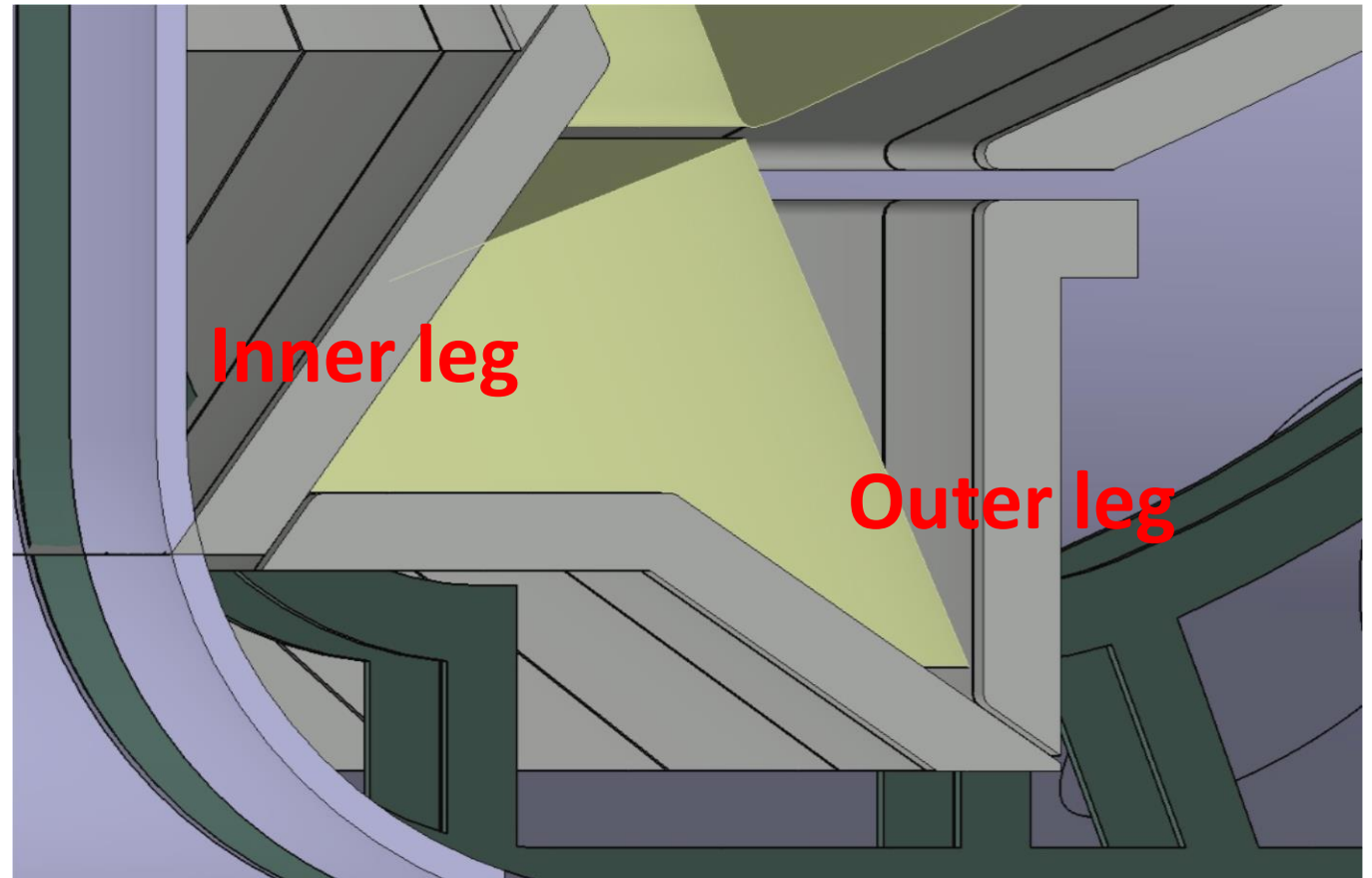
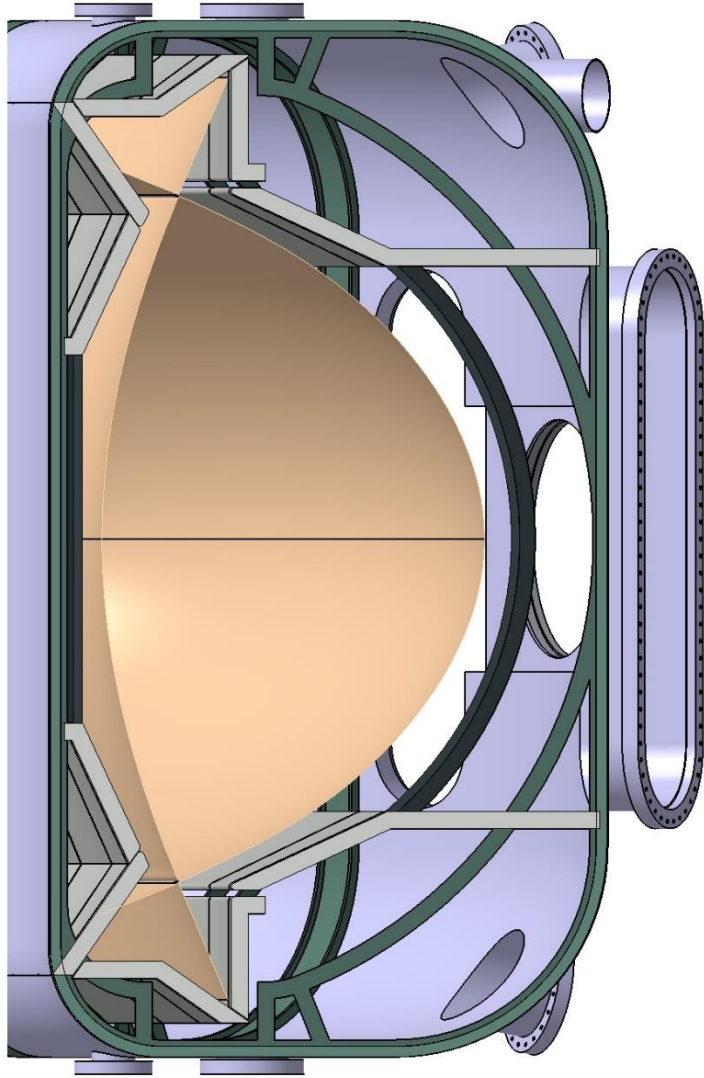
## Energy and power requirements for COMPASS-U:

- TF coils: 70 MW, 130 MJ
- PF coils: <90 MW, <110 MJ
- Additional heating and reserves: 70 MW, 150 MJ (for later increase of additional heating)
- **In total: 180-230 MW, 300-400 MJ**

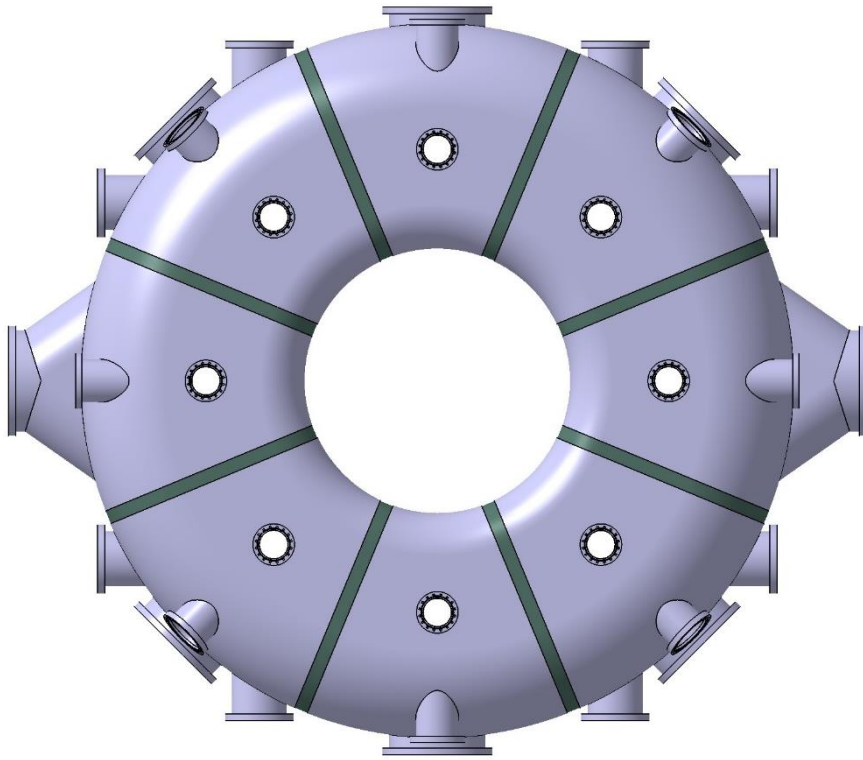
# Single and double null configuration



## Details on divertor geometry

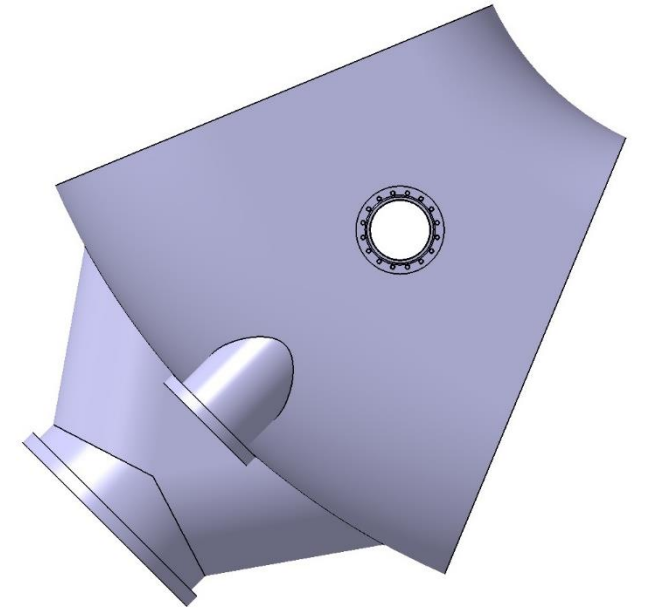
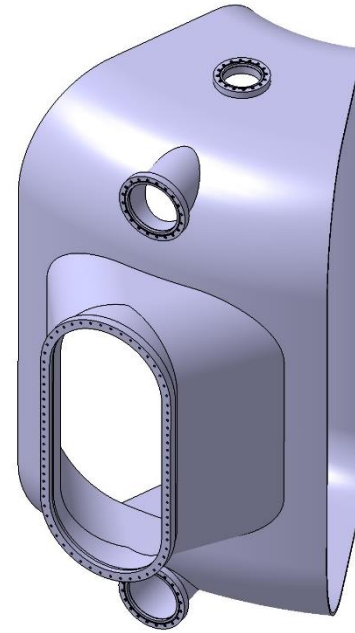
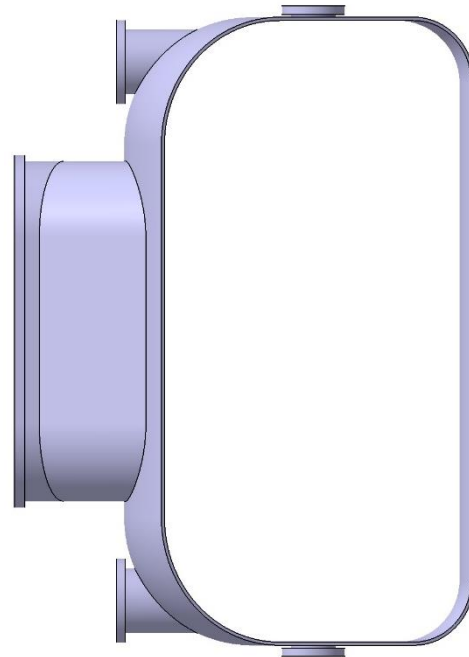


# General view on vacuum vessel and ports



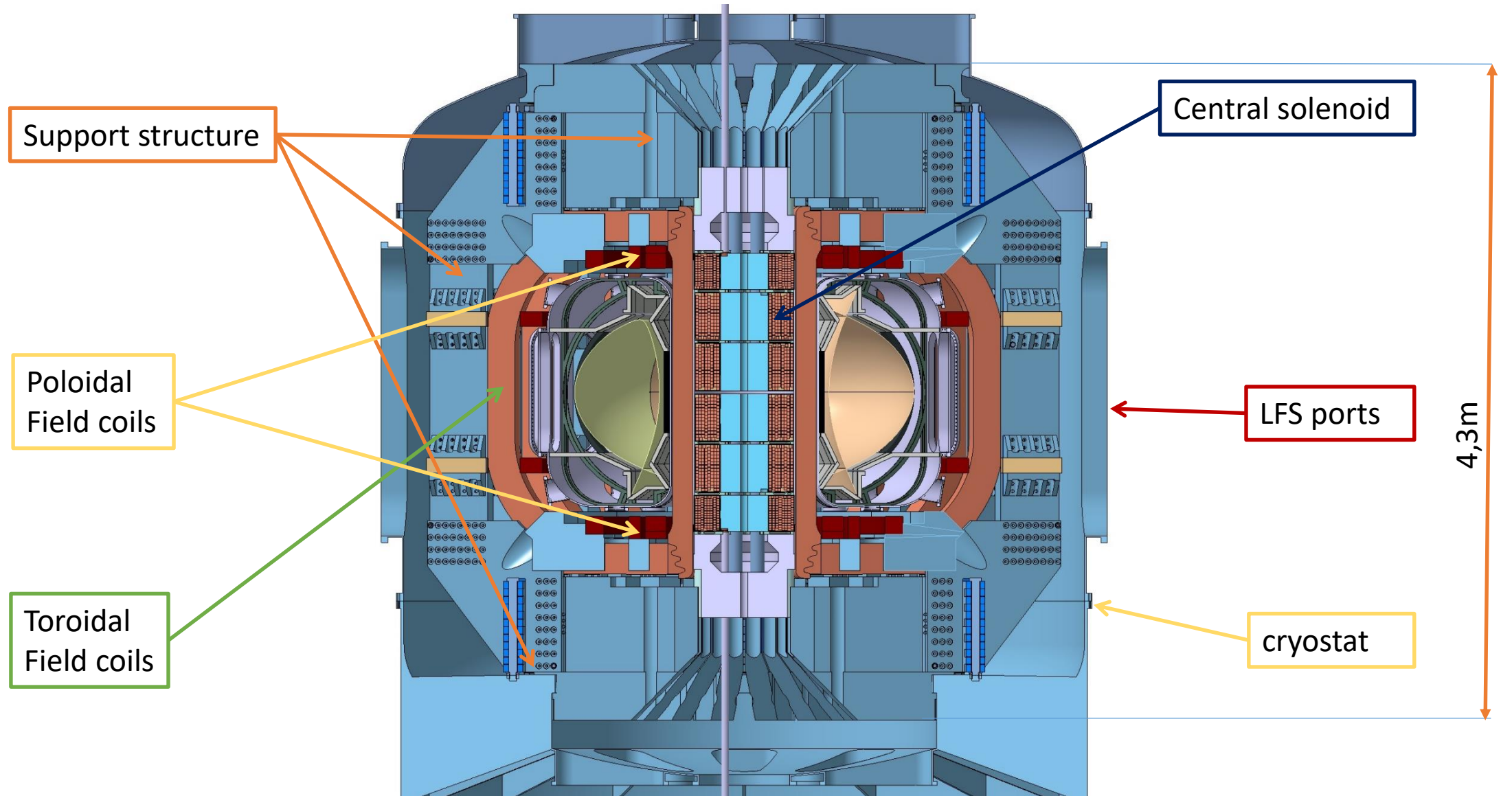
Top view on the vacuum vessel

Large ports  
enabling also  
tangential view



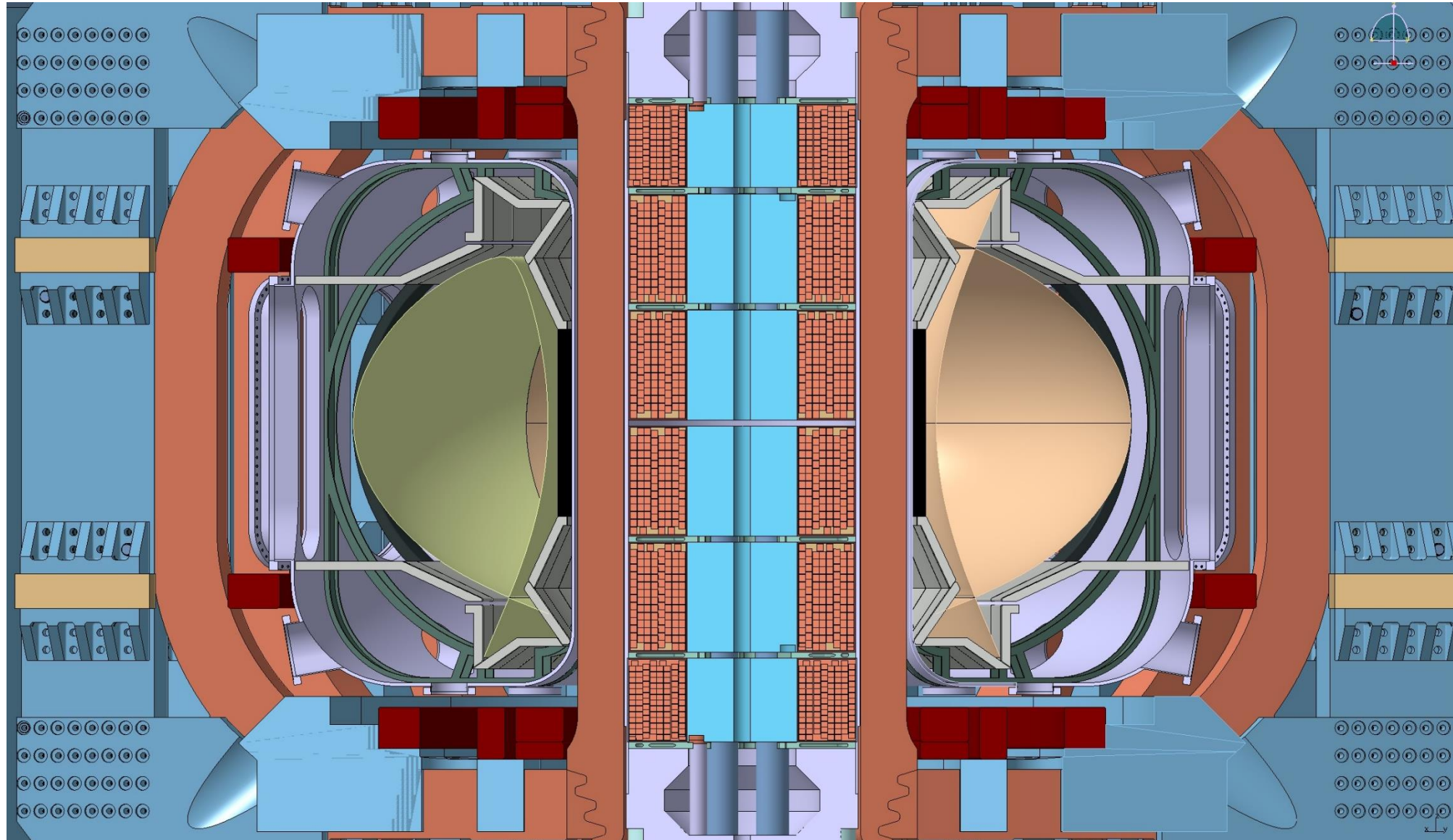


# Cross-section of COMPASS-U



# Single-null configuration

# Double-null configuration





# Top view on the vessel, coils and support structure

